the innocuousness of the sensitized bacteria. With reference to sensitized pneumococci as a vaccine, Leon and Aoki have had good results in experimental animals; the innocuity is quickly obtained and is more durable than in the case of ordinary pneumococci. A negative phase is not obtained after injection, and the immunity to subsequent inoculation was sometimes very striking. Vaccination against typhoid fever is of interest in view of the fact that Besredka (with Metchnikoff) has used the living sensitized typhoid bacilli for the purpose. Encouraged by the results obtained in chimpanzees, they have carried on the experiments in man. Alcock has proved in the case of 44 persons that the procedure is a harmless one; the sensitized vaccine leads to little or no general or local reaction, and Besredka states that 700 human subjects of recent experiments bear witness to its harmlessness. He cites the work of Garbat and Meyer, as to the effect on the serum of the inoculated animals. The immunity of these animals surpassed that of the animals immunized in the old way, nevertheless, neither agglutination nor fixation of the alexin could be cited as indications of this immunity.

Some Facts about the Epidemiology of Tuberculosis.—A. CALMETTE (*Ann. de l'Inst. Pasteur*, July, 1912, vol. xxvi) has brought forward considerable evidence upon the existence of tuberculosis in the French colonies. In the tropics, tuberculosis goes hand in hand with civilization. Black races, where they are uncontaminated from without, remain very free from the disease. None, however, of the races studied were immune, and the last comers to civilization were less immune than those who had mixed somewhat with the outside world. "It is no longer possible," says Calmette, "to support the hypothesis formulated by von Behring in 1903 that pulmonary tuberculosis in the adult is only a late manifestation of an infection of bovine origin, contracted in the earliest months of life as a result of the ingestion of milk from a bacilli-carrying cow." Among the indigenous population of West Africa and Indo-China, infants are found free of infection up to the time of weaning, after which they are subject to familial and other infections, especially by the custom prevailing in Indo-China, by which some older person chews the rice before putting it into the child's mouth. Later, the pipe, the betel, or the kola nut is freely transferred from mouth to mouth. In West Africa, Indo-China, the Antilles, and in Oceania, "interhuman" contamination alone is at work, since children drink no cow's milk, and indigenous cattle are as yet uninfected. In older colonies, the conditions approximate to the state of affairs seen in Europe, and tuberculous milk must be admitted to be in some degree responsible.

The Process of Vital Staining.—W. SCHULEMANN (*Zeitsch. f. exper. Path. u. Ther.*, 1912, Band xi, Heft. 2) makes certain observations upon the relationship between the chemical constitution of cells and their stainability during life. He considers that the granules in the cells that exhibit the stain are formed as a result of the entry of the coloring material to the cell, and that there occurs a chemical combination between the coloring matter and a (hypothetical) reaction-body which is formed for the purpose. This view is supported by the fact that in intensifying experiments where the color is re-administered, the number of granules increases but not the intensity of color of the individual granule. The form of these granules is not constant, and seems to depend upon the speed of diffusion of the coloring agent, being smaller and more uniform with slowly diffusing agents, larger, more irregular, and even at times cubical with those agents that diffuse rapidly. Attempts at combined staining of the granules are unsuccessful, and the granules are entirely absent in certain types of cell, both of which facts are cited in favor of the existence of reaction-bodies; even stronger evidence is the observation that in a cell where poisons are present which damage the reaction-bodies, these become free and diffuse out of the cell. Goldmann considers the reaction-body to be a lightly-bound fat-albumin molecule or group of molecules.

A Comparative Study of Antibodies.—It is daily becoming better understood that all antibodies that are produced by the cell are not available for the cure or prevention of infection or disease; that the existence of one antibody in excess does not speak for the necessary existence of another. KOLMER (*Jour. of Med. Research*, July, 1912, vol. xxvi, No. 3) found, in typhoid and cholera immune serums, that there is no relation between the degree of complement fixation and the opsonins, agglutinins, and bacteriolysins, while there did appear to be a relation between the amount of opsonins and of bacteriolysins. The same antigen may stimulate the production of different antibodies, lysins, agglutinins, opsonins, antitoxins, and other complement-fixing bodies, and one antigen tends to produce excess of one or more antibodies, while another antigen produces others. Each antibody has a direct relationship to its antigen, but not necessarily to the other antibodies. Nevertheless, the existence of an excess of one or more of the antibodies is often good presumptive evidence of the existence of excess of yet others. The presence of complement fixation is not, however, such good evidence as it at first appeared, of the existence of protective antibodies. Kolmer found that the complement-fixing body (an antibody in one sense of the word) bore no relation to the other antibodies. In curative and prophylactic serums, it is true that the antitoxins, the bacteriolysins, and the opsonins bear some relation quantitively one to another; but the agglutinins (and precipitins) are not directly opposed to the antigen, and are not definitely protective to the organism, although the serum which shows an excess of these probably contains excess of the other bodies which *are* protective. Complement fixation power, Kolmer concludes, is not a measure of bactericidal power; there is probably a special antibody produced which is capable of binding hemolytic complement without, at the same time, being protective to its own organism or destructive to the antigen which gave rise to its production.

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